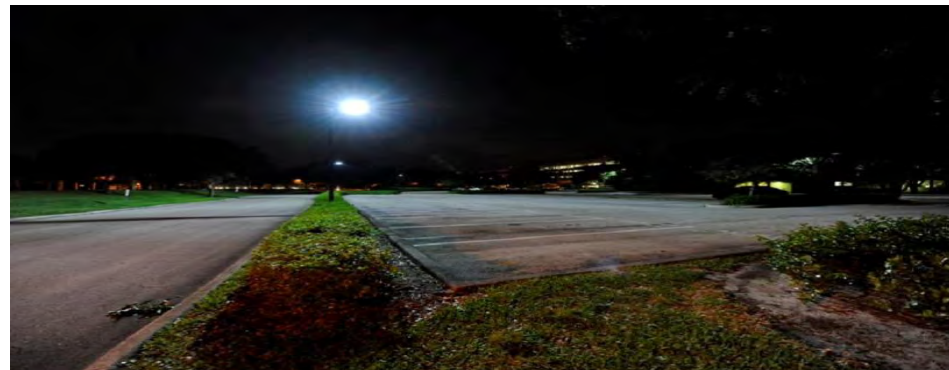


Commercial Building Energy Alliance LED Parking Lot Performance Specification

LIGHTFAIR
May 2010

Jason Tuenge
Linda Sandahl
Eric Richman
Pacific Northwest National Laboratory

- Background
- Specification Overview
- New Construction Application
- Retrofit Application
- Other CBEA Specifications
- Resources/Contacts



Developed by US DOE Commercial Building Energy Alliances (CBEA)

- Started with a Retail Energy Alliance, but Hospital and Commercial Real Estate sectors now support the spec
- Focus: energy savings and lighting quality
- CBEA members are excited but cautious about LED technology (long term performance is unproven)
- Performance versus product spec



Retail
Energy Alliance



Commercial Real Estate
Energy Alliance

Hospital
Energy Alliance

Power Density Limits

	CBEA Spec	Std. 90.1-2010	Title 24-2008
Lighting Zone 1	0.04 W/SF	0.04 W/SF	0.036 W/SF
Lighting Zone 2	0.05 W/SF	0.06 W/SF	0.045 W/SF
Lighting Zone 3	0.06 W/SF	0.10 W/SF	0.092 W/SF
Lighting Zone 4	0.08 W/SF	0.13 W/SF	0.115 W/SF

Illuminance Requirements

Main Parking Area		
Ambient Condition	Horizontal Illuminance	Vertical Illuminance
Lighting Zone 0	N/A	N/A
Lighting Zone 1	N/A	N/A
Lighting Zone 2	0.50 fc	0.25 fc
Lighting Zone 3	0.75 fc	0.40 fc
Lighting Zone 4	1.00 fc	0.50 fc

Notes:

1. Values in table are minimum values
2. Horizontal illuminance is on the parking surface
3. Vertical illuminance is taken 5' above finished grade (AFG)

Other Parking Lot Areas



Perimeter Parking



Front Aisle



Loading/Rear Drive

Illuminance Requirements

Other Parking Lot Areas

Ambient Condition	Perimeter Parking	Front Aisle	Entry Drives, Loading Areas, Rear Drives
Lighting Zone 0	N/A	N/A	N/A
Lighting Zone 1	N/A	N/A	N/A
Lighting Zone 2	0.20 fc	1.00 fc	0.20 fc
Lighting Zone 3	0.40 fc	1.50 fc	0.40 fc
Lighting Zone 4	0.50 fc	2.00 fc	0.50 fc

Notes:

1. Values in table are minimum values
2. Horizontal illuminance is on the parking surface

Warranty

- Retailers nervous about investing without sufficient warranty
- Industry moving toward 5-year warranty
- Warranty should cover both light output and color

***5**minimum*

***10**optional*

New Construction Leavenworth, KS



New Construction Leavenworth, KS

- Walmart
- 500,000 sq feet (parking area)
- 92 LED luminaires
- Pole height 37' AFG
- Avg: 1.27 fc Min: 0.8 fc (initial)
- Payback: 6 – 10 years
- Cost of electricity: $\approx \$0.06$ / kWh
- 63% energy savings compared to standard design
- 0.04 W/SF



Retrofit Installation Manchester, NH



Retrofit Installation Manchester, NH

- T.J. Maxx (Anchor)
- 150,000 sq feet (parking area)
- 25 LED luminaires
- Pole height 33' AFG
- Avg: 2.03 fc Min: 1.03 fc (initial)
- Payback: 3 – 10 years
- Cost of electricity: $\approx \$0.14$ / kWh
- ~70% energy savings compared to previous installation design
- 0.04 W/SF



- **High Efficiency Parking Garage Performance Specification**
 - Not limited to LED technology
 - Expected May 2010
- **REA LED Refrigerated Display Case Lighting Performance Specification**
 - Completed May 7, 2010



- Commercial Building Energy Alliances (CBEA)
www1.eere.energy.gov/buildings/alliances/about.html
- LED Performance Specifications and Fact Sheets
www1.eere.energy.gov/buildings/alliances/rea_subcommittees.html
- For more information, contact:
Linda Sandahl
Pacific Northwest National Laboratory
linda.sandahl@pnl.gov